General Information

Site Name and Location:	Former Market Place Shopping Center SiteHilton Head, South Carolina, United States
Description: Historical activity that resulted in contamination.	The former Market Place Shopping Center Site is located on Hilton Head Island, Beaufort County, South Carolina. The former facility operated as a Dryclean USA using perchloroethene and was located in a strip mall building which has been demolished. The site is currently occupied by a supermarket and pharmacy shopping plaza. Approximately 4 feet of fill soil was placed over the area previously occupied by the drycleaner. Land use is commercial to the north and east, residential to the south and west. The site is generally flat with an average elevation of 11 feet above mean sea level. There is a stormwater, tidal drainage lagoon with drainage to a canal that runs through a plantation community to the south. There are 11 public supply wells within a 2-mile radius of the site. The closest one is 2/10ths of a mile away.

Contaminants:

Contaminants: Contaminants present and the highest amount detected in both soil and groundwater (please avoid giving ranges). Other Contaminants Present:Indicates what other contaminants were found on-site	**Contaminant**	**Conc in GW**	**Conc. in Soil**
	Tetrachloroethene (PCE)	27,000 µ : g/L	

Deepest Significant Groundwater Contamination:	41 feet
Plume Size:	28,600 sq ft
Site Hydrology:	

Depth to Groundwater: 10 ft

Lithology and Subsurface Geology: fine silty sands, clay and shellhash.

Conductivity: Unknown

Gradient: 0.006 ft/ft

Media:

Media: DNAPLGroundwater

Remediation Scenario:

Cleanup Goals: Groundwater <5ppb of PCE, <5ppb of TCE, <70ppb of cis,1,2-DCE, <100ppb of trans, 1,2-CDE, <2ppb vinyl chloride

Technologies:

Technologies Used: In Situ:

Monitored Natural Attenuation

Ozone Air Sparge

Other technologies used: C-Sparging with Ozone Injection.

Why the technology was selected: Projected effectiveness - time to cleanup, cost, noise generation (Hilton Head has noise ordinances.)

Date implemented: June 1, 2002

Final remediation design:

Results and Next Steps:

Results to date: As of the last sampling event MW-2I (an intermediate well with the highest beginning concentration on site) has been reduced from 26,800 PCE to 704 PCE. There was a slight rise in TCE and DCE levels at the beginning but is now being reduced.

Next Steps:

Costs:

Cost for Assessment: $160,000

Cost to Design and Implement: $311,000

Cost for Operation and Maintenance: $50,000

Total Costs for Cleanup:

Lessons Learned:

Lessons Learned: 1. You have to have a good engineer assigned to keep the system working. There were a lot of problems with the system shutting itself down because of high ozone levels in the shed, blown fuses, equipment not design for demand specs, etc. 2. 3. 4. 5. 6. 7. 8.

Contacts:

Principal Point of Contact:	Lisa Appel, Project Manager, Assessment and Remediation Phases, South Carolina Department of Health and Environmental Control, Columbia, South Carolina, 803-896-4060Perry Kelso, P.G., Project Manager for Assessment Phase, Ecology and Environment, Tallahassee, Florida 850-574-1400 Grant Olson, Project Engineer for Remediation Phase, Earth Tech, Inc., Greenville, South Carolina 864-234-2264

Site Specific References:

Images:

Images of Site:

Profile last updated on Dec 07, 2003

General Information

Site Name and Location:	Denver Colorado Dry CleanerDenver, Colorado, United States
Description: Historical activity that resulted in contamination.	The site is a former drycleaner located at a shopping center in Denver, CO.

Contaminants:

Contaminants: Contaminants present and the highest amount detected in both soil and groundwater (please avoid giving ranges).	**Contaminant**	**Conc in GW**	**Conc. in Soil**
	Tetrachloroethene (PCE)	18,200 µ : g/L	
	Trichloroethene (TCE) Trichloroethene (TCE)	12,600 µ : g/L	

Other Contaminants Present:Indicates what other contaminants were found on-site	
Deepest Significant Groundwater Contamination:	12 ft bgs
Plume Size:	Not available

Site Hydrology:

Depth to Groundwater:	About 9 ft bgs
Lithology and Subsurface Geology:	The general subsurface conditions consist of sands, silts, and clay overlying siltstone bedrock. Clay, 0-9 ft bgs; Permeable sand and gravel, 9-12 ft bgs; Siltstone, 12+ ft bgs Subsurface conditions appear to be relatively uniform throughout the plume area. The groundwater at the site appears to be confined to the permeable zone overlying the siltstone.
Conductivity:	Not reported

Gradient: The groundwater gradient is generally to the east at approximately 0.121 ft/ft.

Media:

Media: Groundwater

Remediation Scenario:

Cleanup Goals:

Technologies:

Technologies Used: In Situ:

Chemical Oxidation

Other technologies used:

Why the technology was selected: ISOTEC's Modified Fenton''s Reagent was chosen as the remedial technology due to the time constraints related to a real estate transaction involving the contaminated property. Modified Fenton''s Reagent was recognized as a cost effective and expeditious approach to remediating the property.

Date implemented: April 2001

Final remediation design: The remediation program for the site involved two phases of field activities: two injection events for the area inside of the former drycleaner building to treat the contaminant source, and three injection events to treat the entire groundwater plume. The first phase of the remediation program involved the introduction of Modified Fenton''s Reagent into the subsurface through 18 direct push locations (nine points per event) inside the former dry cleaner building. These direct push locations were located on 15-ft centers and shifted laterally between events. The second phase was comprised of three injection events to treat the entire groundwater plume at the site. Direct push injection points were used to deliver reagents to the groundwater plume at the site. These points were spaced on 30-ft centers based on a conservative radius of influence (ROI) of 15 ft determined from a pilot test. The direct push locations for the second and third injection events were shifted laterally from the first event locations to ensure complete reagent coverage across the site. Using this spacing arrangement, approximately 75 points were required during each injection event to treat the groundwater plume. A total 26,987

gallons of ISOTEC reagents were injected through 244 temporary injection locations.

Results and Next Steps:

Results to date: Following the final injection event, PCE concentrations ranged from 70 µ:g/L to non-detect (ND), and the average PCE concentration across the site was reduced from 3,267 µ:g/L to 39.6 µ:g/L, a reduction of 99%. The maximum PCE concentration reduction in existing monitoring wells was observed in monitor well MW-5. The PCE concentration in MW-5 was reduced from 925 µ:g/L to 51 µ:g/L, a reduction of 94%.Following the final injection event, TCE concentrations ranged from 170 µ:g/L to ND, and the average TCE concentration across the site was reduced from 1,387.8 µ:g/L to 64.9 µ:g/L, a reduction of 95%. The maximum TCE concentration reduction was observed in monitor well MW-5. The TCE concentration in MW-5 was reduced from 550 µ:g/L to 52 µ:g/L, a reduction of 90%.Following Modified Fenton''s Reagent treatment, the site underwent four additional quarters of sampling and monitoring. During this time frame, further reductions in groundwater concentrations were achieved since the contaminant source mass was removed and the associated mass flux was greatly reduced. This allowed the dissolved phase plume to shrink as new equilibrium conditions were established between the saturated soil and the aqueous phases. The TCE average of all wells (including source area wells) was reduced by 98%.

Next Steps:

Costs:

Cost for Assessment:

Cost to Design and Implement:

Cost for Operation and Maintenance:

Total Costs for Cleanup: $39/yard3 of saturated soil treated Costs include pilot scale tests, full-scale treatment, and direct push injection equipment and labor.

Lessons Learned:

Lessons Learned: 1. Immediately following treatment, the dissolved phase and saturated soil are in dis-equilibrium. As the site re-equilibrates, dissolved phase concentrations come down as there is insignificant amount of contaminant mass in the saturated soil to drive high dissolved phase concentrations.2. 3. 4. 5. 6. 7. 8.

Contacts:

Principal Point of Contact: Kathy Wahlberg Hazardous Waste Corrective Actions Unit Colorado Department of Health and Environment Denver, CO303-692-337 Kathy.wahlberg@state.co.usEliot CooperISOTEC5600 S Quebec Street, Suite 320DGreenwood Village, CO 80111303-843-9079 x 20 ecooper@insituoxidation.com

Site Specific References:

Site Specific References:

Images:

Images of Site:

Profile last updated on Dec 08, 2003

General Information

Site Name and Location: United Cleaners, Site # 1973Lemont, Illinois, United States

Description: Historical activity that resulted in contamination. The drycleaner occupies a 2080 square ft area within the Lemont Plaza strip mall. The mall consists of 5 single story buildings and was built in 1960. The drycleaning operation was started at that time using PCE. A 150 gallons above ground storage tank (AST) was previously located on-site but was removed in 1995. Some staining was located in the area of the former AST. An alley separates the site from an office building and multi-family residential dwellings. Other areas surrounding the property are primarily used for commercial purposes.

Contaminants:

Contaminants: Contaminants present and the highest amount detected in both soil and groundwater (please avoid giving ranges).

Contaminant	Conc in GW	Conc. in Soil
1,1,1-Trichloroethane		5.61 mg/kg
1,1-Dichloroethene		0.306 mg/kg
cis-1,2-Dichloroethene		144 mg/kg
Tetrachloroethene (PCE)		4,300 mg/kg
trans-1,2-Dichloroethene		0.865 mg/kg
Trichloroethene (TCE)		170 mg/kg
Vinyl Chloride		2.84 mg/kg

Other Contaminants Present:Indicates what other contaminants were found on-site

Deepest Significant Groundwater Contamination:

Plume Size:

Site Hydrology:

Depth to Groundwater: Not encountered at 48 ft

Lithology and Subsurface Geology: Native soils in the vicinity are Wadsworth and Haeger Members of Wedron Formation. This type of soil is characterized by silty and pebbly drifts containing local areas of sandy to gravely till in outer moraines. The bedrock in the site consists of Silurian-aged dolomite, which would be expected to be encountered 250 ft bgs.

Conductivity: 5.4x10-6 ft/day

Gradient: None (no GW)

Media:

Media: Soil

Remediation Scenario:

Cleanup Goals: Site-specific: 1-1-DCA 1830 mg/kg cis-1,2-DCE 1900 mg/kg PCE 100 mg/kg TCE 440 mg/kg VC 0.25 mg/kg

Technologies:

Technologies Used:

Other technologies used: Heat Soil Vapor Extraction (HSVE) -- in situ

Why the technology was selected: This was a pilot project for the Fund. Institutional controls are cheaper and do not require O&M.

Date implemented: 8/26/2002

Final remediation design: The treatment system uses a series of in-ground coils to transfer heat, increase the volatility of the organic contaminants, and facilitate removal of the volatile solvents from the soil using a vapor extraction system. After operation for 120 days, the system was modified slightly. Although the system was working, it was felt some system modifications should be made

to ensure that the remediation of the remaining chlorinated solvents would be completed in a timely fashion. Modifications included an additional heat point and an additional extraction well in the remaining hot spot.

Results and Next Steps:

Results to date: It was originally thought that 120 days would be adequate to clean up the site, but it is necessary to extend the clean up time since the source area has not met the clean up levels. The treatment at the site has been extended until June 30, 2003. The HSVE system has resulted in lower PCE concentrations, with reductions from soil concentrations of 4,300 mg/kg to 2,400 mg/kg. Additionally, one of the two areas where the remediation system was installed has been completely cleaned up. Even so, operation of all the heating coils continued at the entire site to provide further remediation. The vapor extraction system, however, was turned off in this remediated area. Extraction has continued only at those areas where the objectives have not yet been met.

Next Steps: Continue the operation of the treatment system. Conduct additional sampling to assess system performance.

Costs:

Cost for Assessment: $33,910

Cost to Design and Implement: $78, 986 (includes monitoring costs)

Cost for Operation and Maintenance:

Total Costs for Cleanup:

Lessons Learned:

Lessons Learned: 1. HSVE systems can be useful and effective at some dry cleaners where geology is tight clay soil and no other cost effective technologies are available. 2. Remote access capability to check the system is recommended as a minor system modification for HSVE.

Contacts:

Principal Point of Contact: Juho So
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Site Specific References:

Site Specific References:

Images:

Images of Site:

Profile last updated on Dec 15, 2003